

CELLULAR PHONE AND ATTACHMENT THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a cellular phone, and particularly, to a cellular phone capable of attaching an attachment thereto.

2. Description of the Related Art

10 In recent years, varieties of colors and patterns are formed on backs (exterior surface portions when folding-type cellularphones are folded) of the folding-type cellular phones. Japanese Patent Laid-Open No. 2002-125022 discloses a cellular phone in which a glazed panel of a back is freely changeable to suit user's preference. However, a user cannot freely add
15 functions to a purchased cellular phone. Moreover, in order to change setting conditions for the cellular phone in response to a usage situation, entries are required for many setting items.

SUMMARY OF THE INVENTION

20 A cellular phone of one aspect of the present invention is capable of attaching an attachment thereto, and includes a signal detection unit that detects a signal intrinsic to the attachment, and a control unit that controls at least one of a change of setting conditions and an addition of functions in
25 the cellular phone based on the signal. In one embodiment of the cellular phone, it is possible to identify a type of the attachment attached thereto based on the specific signal. The cellular phone of the embodiment can include a terminal which transmits/receives the signal to/from the attached attachment,

and a power supply terminal which supplies electric power to the attachment.

An attachment of the present invention is attached to the cellular phone, and includes a signal output unit which outputs
5 a specific signal corresponding to a type of the attachment, and an output terminal which outputs the signal to the cellular phone. An attachment of the embodiment of the present invention can include a function unit which performs a predetermined function.

10 Another aspect of a cellular phone of the present invention is a cellular phone to which a detachable attachment is attached. This attachment includes a signal output unit which outputs a specific signal corresponding to a type thereof, and an output terminal which outputs the signal to the cellular phone. The
15 cellular phone includes a signal detection unit which detects the signal intrinsic to the attachment, and a control unit which controls a change of setting conditions for the cellular phone based on the signal. The attachment can include a function unit which performs a predetermined function, and the control unit
20 can control at least one of a change of setting conditions and an addition of functions in the cellular phone.

Still another aspect of a cellular phone of the present invention is a cellular phone to which a detachable attachment is attached. The attachment includes a signal output unit which
25 outputs a specific signal corresponding to a type thereof, and an output terminal which outputs the signal to the cellular phone. Moreover, the cellular phone includes a signal detection unit which detects a signal intrinsic to the attachment, and a control unit which controls a change of setting conditions based on the

signal.

The cellular phone can easily add new functions thereto and can easily change many setting items by attaching the attachment thereto.

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BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will become apparent from the following detailed description when taken with the accompanying drawings
10 in which:

FIGS. 1A, 1B, 1C and 1D are side and back views in a closed state of a folding-type cellular phone and side and front views in an opened state thereof, respectively;

FIG. 2 is a block diagram of a cellular phone and an
15 attachment of an embodiment;

FIGS. 3A, 3B and 3C are a perspective view of the embodiment of the attachment, a perspective view showing a method for attaching the attachment to the cellular phone, and a perspective view of the embodiment of the cellular phone to which the
20 attachment is attached, respectively;

FIG. 4 is perspective views showing another example of the method for attaching the attachment to the cellular phone;

FIGS. 5A, 5B, 5C, 5D and 5E are perspective views showing embodiments of the attachment;

25 FIGS. 6A and 6B are perspective views of other embodiments of the attachment;

FIGS. 7A, 7B, 7C, 7D and 7E are perspective views of the embodiments of the attachment, viewed from another direction;

FIGS. 8A, 8B, 8C, 8D and 8E are front views showing other

embodiments of the attachment;

FIG. 9 is a perspective view showing an embodiment of a cellular phone to which the attachment shown in FIG. 8B is attached;

5 FIG. 10 is a table of embodiments of setting conditions and new functions for the cellular phone, which are set by the attachment;

FIG. 11 is a flowchart showing control of a control unit of the cellular phone;

10 FIG. 12 is a block diagram of a cellular phone to which an attachment without a function unit is attached;

FIGS. 13A, 13B and 13C are front and side views of attachments, and a front view of a cellular phone in which the attachments are attached to a display unit arrangement surface and an operation unit arrangement surface, respectively; and

15 FIG. 14 is a table of embodiments of setting conditions for the cellular phone, which are set by the attachment without the function unit.

20 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1A, 1B, 1C and 1D show a folding-type cellular phone, in which two casings are coupled to each other by a hinge 40, as an embodiment to which the present invention is applied. FIG. 1B is a back view of the cellular phone which is folded. The cellular phone includes a liquid crystal display unit 33 on a back thereof. As shown in FIGS. 1C and 1D, surfaces on which the large liquid crystal display unit and an operation unit are arranged, the surfaces appearing when the cellular phone is opened, are a front surface of the cellular phone. It is possible

to apply the present invention not only to the folding-type cellular phone but also to a straight-type one.

FIG. 2 shows a block diagram of an embodiment of a cellular phone to which an attachment 2 is attached. A cellular phone 1 includes a signal detection unit 101, a control unit 102, a power supply 103, a signal terminal 104, and a power supply terminal 105. The signal detection unit 101 receives a signal 207 intrinsic to the attachment 2 through the signal terminal 104, detects that the attachment 2 has been attached to the cellular phone 1, identifies a type of the attachment 2, and outputs an identification signal 106 to the control unit 102. The control unit 102 receives the identification signal 106. When the identification signal 106 requires a new setting condition, the control unit 102 changes a setting condition of the cellular phone 1 to a predetermined setting condition corresponding to the identification signal 106. Moreover, the control unit 102 verifies, by means of the identification signal 106, whether the additional function unit 203 is present in the attachment 2, and identifies a type thereof when the function unit 203 is verified to be present. In this case, in order to add the function unit 203 included in the attachment 2 to the cellular phone 1, the control unit 102 transmits a control signal 107 to the attachment 2. The control unit 102 controls the power supply 103. When the cellular phone 1 attaches the attachment 2 thereto, the signal terminal 104 and power supply terminal 105 of the cellular phone 1 are connected to a signal terminal 205 and power supply terminal 206 of the attachment 2, respectively. The attachment 2 includes the additional function unit 203, an additional function control unit 202, a

signal transmitting/receiving unit 201, a power supply control unit 204, the signal terminal 205, and the power supply terminal 206. The signal transmitting/receiving unit 201 transmits the specific signal 207 to the cellular phone 1, receives the control
5 signal 107 from the control unit 102, and transmits a control signal 208 to the additional function control unit 202. The additional function control unit 202 receives the control signal 208, and transmits an additional function unit control signal 209 to the additional function unit 203, thus controlling the
10 additional function unit 203. The additional function unit 203 is, for example, at least one of a camera, a speaker, a liquid crystal display unit, and a touch panel. The power supply control unit 204 receives a supply of electric power through the power supply terminal 206, and supplies the power to the additional
15 function unit 203 and others. In place of the additional function control unit 202 and the power supply control unit 204, the control unit 102 of the cellular phone 1 can execute respective controls thereof.

Referring to FIG. 3A, the attachment 2 in this embodiment
20 includes a liquid crystal display unit 23, and in an inside thereof, includes a space portion 30 into which the cellular phone 1 is engaged. FIG. 3B shows a method for attaching the attachment 2 to the folding-type cellular phone 1. The space portion 30 in the attachment 2 is engaged onto a casing of the cellular
25 phone 1, which includes a display unit, along an arrow direction in FIG. 3B. In this case, the terminals 104 and 105 of the cellular phone 1 are connected to the terminals 205 and 206 of the attachment 2, respectively. A major portion of one surface of the attachment 2 is cut away, and accordingly, the display unit of the cellular

phone 1 is not covered with the attachment 2. A groove portion or a protruding portion, which is formed on the attachment 2, is engaged to a protruding portion or a groove portion, which is formed on the casing of the cellular phone 1, thus making it possible to attach the attachment 2 to the cellular phone 1 smoothly. FIG. 3C is a perspective view of the folding-type cellular phone 1 to which the attachment 2 is attached.

FIG. 4 shows another embodiment of the method for attaching the attachment 2 to the folding-type cellular phone 1. The attachment 2 is attached to the casing of the cellular phone 1 from a backside of the cellular phone 1, that is, along an arrow direction in FIG. 4.

FIGS. 5A to 5E show embodiments of the attachment, which include a camera 21, a speaker 22, a liquid crystal display unit 23, a touch panel 24, and a transparent portion (or opening portion) 25, respectively.

FIGS. 6A and 6B show embodiments of the attachment. FIG. 6A shows the attachment 2 for use in the attachment method shown in FIG. 4, the attachment 2 including a surface on which the liquid crystal display unit 23 is arranged, and two side surfaces sandwiching the casing of the cellular phone. FIG. 6B shows another embodiment of the attachment 2 including a surface on which the liquid crystal display unit 23 is arranged, and three side surfaces surrounding the casing of the cellular phone. These three side surfaces have a height shorter than a thickness of the casing of the cellular phone. However, the height of the three side surfaces may be equal to the thickness of the casing.

FIGS. 7A to 7E are perspective views of the embodiments

of the attachment, which are shown in the above drawings and viewed from another direction. As methods for attaching these attachments, for example, there are: first, a method for inserting the casing of the cellular phone into the attachment
5 (for example, FIGS. 7A and 7B); second, the method for engaging a groove portion or a protruding portion, which is formed on the attachment, to a protruding portion or a groove portion, which is formed on the casing of the cellular phone (for example, FIGS. 7C and 7D); third, a method for fastening the attachment
10 to the casing by means of screws (for example, FIGS. 7C, 7D and 7E); and others.

FIGS. 8A to 8E show embodiments of the attachment, which include transparent portions 29. FIG. 8A shows an embodiment of the attachment, which includes the transparent portions 29
15 and a camera 26, and FIG. 8B shows an embodiment of the attachment, which includes the transparent portion 29 and a speaker 27. Each of the attachments including the transparent portions 29 is applied to the cellular phone including the liquid crystal display unit on the backside thereof. The transparent portions
20 29 can be opening portions. Alternatively, a transparent plate can be arranged on each of the transparent portions 29. When the attachment is attached to the casing of the cellular phone, the transparent portion 29 can have a size sufficient to enable a user to view the whole of the liquid crystal display unit on
25 the casing of the cellular phone. However, the size of the transparent portion 29 may be smaller than that of the liquid crystal display unit on the casing. In this case, the control unit of the cellular phone recognizes a position and shape of the transparent portion 29 of the attachment based on a signal

received from the attachment, and controls the liquid crystal display unit on the casing in accordance with the shape of the transparent portion 29. When a touch panel is formed on a part or all of the liquid crystal display unit on the casing of the cellular phone, the transparent portion 29 is an opening. FIG. 9 is a perspective view of the cellular phone 1 to which the attachment 2 including the transparent portion 29 and the speaker 27 is attached.

FIG. 10 shows embodiments of setting conditions for the cellular phone, which are set in response to attachments, and functions added thereto in response to the attachments, when the attachments are attached to the cellular phone. As items of the setting conditions, for example, there are a display, a sound, a memory access, and a communication control. With regard to the display, for example, it is possible to set a control area of a backside display unit, a display content on a screen, a standby screen, icons, fonts and the like. With regard to the sound, it is possible to set a ringtone, a text reader, a key operation sound and the like. With regard to the memory access, it is possible to set a phone directory, a history, a bookmark and the like. The communication control relates to limitations on functions regarding the Internet, which are, for example, a connection prohibition to the Internet, a connection only to a permitted web site, a download prohibition of a content, a mail blocking (automatic deletion), a transmission prohibition of mail and the like. Furthermore, it is possible to set whether or not use of an agent function is enabled. In this agent function, a web server can be automatically accessed at a fixed interval, and latest data can always be read out therefrom as if an always-on

connection were made therewith. Accordingly, it is made possible to check weather information and stock price information, to manage a schedule, and so on. For example, when the attachment including the display unit is attached to the cellular phone, the cellular phone automatically accesses a predetermined server, and always displays a latest schedule for a group member on the display unit. Moreover, as additional functions, there are functions of a camera, light emission, a speaker, display, a touch panel, fingerprint authentication and the like. When the attachment includes the function unit, the function thereof is added to the cellular phone. For example, when an attachment (a) is attached to the cellular phone, the function of the camera is attached thereto, and simultaneously, many predetermined setting conditions are set. For example, the memory access is changed to a setting for personal use, which is preset by a user, and the communication limitations are set to be "none." In a similar way, also for an attachment (b), the setting conditions can be changed and the functions can be added. To an attachment (c), the functions are not added but, for example, the memory access is changed to a setting for a business use, and the communication limitations are set to be "present."

When the attachment is detached from the cellular phone, the cellular phone can automatically return to original setting conditions before the attachment is attached thereto. When the attachment is attached to the cellular phone, a user can manually change the setting conditions for the cellular phone, and make the attachment store the changed conditions. In this case, the attachment includes a predetermined memory unit. The control unit can control only to add the functions in accordance with

the signal transmitted from the attachment.

FIG. 11 shows an embodiment of a flow of changing the setting conditions for the cellular phone to which the attachment is attached. The cellular phone 1 verifies whether or not the signal transmitted from the attachment is present, and determines whether or not the attachment is attached thereto (S101). Furthermore, the cellular phone 1 determines a type of the attachment based on a content of the signal (S102, S105 and S108). Next, the cellular phone 1 verifies whether or not authentication of a user is present (S103, S106 and S109). In this case, when the user approves the attached attachment, the user performs the authentication by means of an entry of a secret identification code, recognition of the fingerprint or others. By such an entry as described above, the cellular phone can add the functions in response to the respective attachments, and can change the setting conditions (S104, S107 and S110). When the authentication of the user is not performed, the cellular phone does not perform the addition of the functions and the change for the setting conditions. The user is requested to detach the attachment attached at present or to change the attachment to another one.

FIG. 12 shows a block diagram of an embodiment of a cellular phone to which another type of attachment 2 is attached. The cellular phone 1 includes a signal detection unit 501, a control unit 502, a power supply 503, and a terminal 504. The signal detection unit 501 receives, through the terminal 504, a signal intrinsic to the attachment 2 and outputted by a signal transmitting/receiving unit 620 of the attachment 2, detects that the attachment 2 has been attached to the cellular phone

1, identifies a type of the attachment 2, and outputs an identification result to the control unit 502. The control unit 502 controls the power supply 503, and supplies required power to the attachment 2 through the terminal 505. This attachment
 5 2 does not include the additional function unit, and the control unit 502 receives the signal from the attachment 2, and sets setting conditions corresponding to the signal in the cellular phone 1.

FIGS. 13A and 13B are plan view and side view of the
 10 embodiment of the attachment 2 which is attached to a front surface portion of the folding-type cellular phone 1 and is shown in FIG. 12. As the attachment 2, possible ones are one to be attached to a casing including a display unit, and one to be attached to an operation unit. The attachment 2 includes opening portions
 15 617, 618 and 619, and protruding portions 609 to 616. In this drawing, the attachment 2 attached to the operation unit includes a coupling terminal 621. However, the attachment 2 attached to the display unit can include the coupling terminal 621. If
 20 one of the two attachments 2 includes the coupling terminal 621, it is possible to attach the one attachment 2 to the cellular phone 1. The front surface portion of the cellular phone 1 includes recess portions 601 to 608, and a coupling portion 504. FIG. 13C shows the front surface portion of the cellular phone 1 attaching the attachment 2 thereto. The protruding portions
 25 609 to 616 of the attachment 2 are engaged into the recess portions 601 to 608 of the cellular phone 1, the coupling terminal 621 is engaged into the coupling portion 504, and thus the attachment 2 is attached to the cellular phone 1. The casing including the display unit can include the coupling unit 504. When the

cellular phone 1 is of a type other than the folding type, one piece of the attachment 2 can be used.

FIG. 14 shows an example of setting conditions set for the cellular phone 1 when the above-described attachments denoted here by reference symbols (d), (e) and (f) are attached thereto. Basically, the same items as those of the setting conditions shown in FIG. 10 are set as predetermined conditions.

When the attachment is attached to the cellular phone, the cellular phone can include the new functions, and can easily change the current setting conditions to the predetermined conditions.

While the present invention has been described in connection with certain preferred embodiments, it is to be understood that the subject matter encompassed by the present invention is not limited to those specific embodiments. On the contrary, it is intended to include all alternatives, modifications, and equivalents as can be included within the spirit and scope of the following claims.